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Validity and Reliability of Footballer Assessment Instrument (FAI) for Invasion Games in Football

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Abstract
The aim of this study is to determine the validity and reliability of Footballer Assessment Instrument (FAI). This instrument was used for under 14 footballers. The FAI is a holistic instrument comprised of cognitive, psychomotor and affective. The findings showed high validity and reliability for FAI for football in invasion games. The final validity analysis shows the agreement between expert panel is 91%. While the reliability analysis using Alpha Cronbach for FAI instrument as follow: (i) cognitive r = .70, (ii) psychomotor r = .74 and affective r = .72. In conclusion, FAI was found to be very useful to assess football players from three aspects which is cognitive, psychomotor and affective.

Keywords: Football, Invasion games, Footballer Assessment Instrument (FAI)

Introduction
A comprehensive assessment tools will provide a good insight to a coach. Assessment is one of the effort in learning (Tyler, 1964). According to Buck et al. (2007) assessment will assess the learning stage or the performance stage, strength and weaknesses in certain learning process and also provide information about the effectiveness of a training program. However, the assessment instrument is validated when it's really measures what the needed (Ahmad, 2004). This study aim to determine the validity and reliability of FAI in assessing football players.

The FAI instrument was given to the expert to determine the validity and reliability. According to Pallant (2007) validity refers to how the instrument actually assessing the study items. Validity was run to ensure the indicators that been use is measuring the actual purpose of the research (Sabitha, 2006). Wee (2009) says that the assessment aspect in physical education should consists of cognitive, psychomotor and affective. However, current assessment in school measures student’s involvement based on their attendance (KPM, 2011). On the other hand, matriculation college assess their student based on few items like attendance, practical activities, involvement and tittle. The current assessment is not complete nor holistic. In order to assess full aspect of assessment it’s must consist of cognitive, psychomotor and affective. These three domain will effect individual in completed their tasks (Ramasamy, 2000).

Cognitive domain refers to the individual way of thinking and individual intellectual. The cognitive domain is to assess the knowledge level, understanding and intelligence of an individual (Hajar, 2004). The cognitive domain is an important aspect to help athlete to perform in sports (Regnier et al., 1993; Brown, 2001; Abbot & Collins, 2002, 2004; Abbot et al., 2005). Cognitive also about perception,
memory and remembering (Pithers, 2000; Kannapiran, Kob, Rus, & Sulaiman, 2018; Singh, 2018; Akomeah, Bentil, Musah, 2018)

Psychomotor domain includes the physical movement, coordination and motor skills. Psychomotor is about the skills and performance of muscle movement (Rupani & Buttho, 2011). Affective domain is refers to the changes of feeling, attitude and value that contribute to the thinking and behaviour (Allen & Friedman, 2010).

In conclusion, the combination of cognitive, psychomotor and affective domain will produce a comprehensive and holistic instrument to assess football players. The suitable, right and holistic instrument may lead to provide information to coach from time to time. The right instrument able to determine the player’s strength and weakness. This information will help coach to plan the next steps to improve player’s performances.

The Objective of the Study
The objectives of this study is to identify the validity and reliability of FAI instrument. Below is the objectives of this study:

i) To identify the validity of FAI instrument towards the performance assessment of football players under 14 years old.

ii) To identify the reliability of FAI instrument toward the performance assessment of football players under 14 years old.

Methodology
The FAI instrument is use by the coaches to assess the football player during the training. This study involves two coaches and 30 football players under 14 years old from one of Sekolah Menengah in Johor Bahru. Besides, there are five expert panels involved in order to identify the validity of the instrument. The FAI instrument will use the observation from video recording to assess the performance of football players.

Development of Footballer Assessment Instrument (FAI)
The FAI instrument was developed with three main domains which is cognitive, psychomotor and affective. Donabedian Model in Figure 1 was used and it’s consist of three main items which is input, process and output. Besides, Model Morrow et al. (2005) was used in constructing the FAI as per Figure 2.
Figure 1 shows the development process of FAI instrument to assess the performance of football players. The process is based on Donabedian Model which was introduced in 1966. This model consists of three main aspects which are input, process, and output (Donabedian, 1985).

The first step of developing the FAI instrument involves setting what the researcher wanted to achieve in this model. In this study, the input is the assessment of football players. The assessment depends on the research objective. Focus on this study is to assess football players from three main aspects which are cognitive, psychomotor, and affective. Several numbers of theories were referred in order to develop the instrument. The assessment items were developed according to the Fitts and Posner theory. The cognitive aspect was referred to Bloom (2001), psychomotor aspect referred to Dave (1970), and affective aspect referred to Krawthwohl et al. (1964).

The second step in developing the FAI instrument is by referring to Morrow Model (2005). There are eight steps needed to be done in order to develop the instrument as per Figure 2. The process (Morrow Model) covers the initial stage of development of items in the assessment instrument until the process of getting the validity and reliability.

The next step is the output of this study which is the FAI instrument. The football players will be categorized into five levels which are excellent, pre-excellent, expert, pre-expert, and beginner.

![Figure 2. The flowchart of Developing Learning Assessment Model (Morrow et al., 2005)](image)
There are several steps to be complied in the study to ensure that the instrument can achieve the best quality to measure football player’s performance. The steps are as follows:

**Step One**

The first step is to choose the right and suitable criteria of good instrument. The FAI instrument is the assessment of football players based on the best evaluation criteria in learning which is the three domain learning which is cognitive, psychomotor and affective.

**Step Two**

The second process is to design a right or suitable criteria and rubrics for FAI Instrument. The criteria is divided into three categories which is Part A for Psychomotor, Part B for Cognitive and Part C for Affective. There are five items in Part A, 2 items in Part B and 2 items in Part C.

**Step Three**

The third process is to study the previous related literatures. The FAI instrument was developed based on the three domain of learning which is Cognitive domain refers to Bloom et al. (1956), Psychomotor domain refers to Dave (1970) and Affective domain refers to Krathwohl et al. (1964).

**Step Four**

The fourth process is to choose the most suitable items for the instrument to assess the performance of football players. In this case, the items were chosen based on the three domain of learning.

**Step Five**

The fifth process is to set the procedures of assessment the FAI instrument. Coaches need to evaluate football players based on the rubrics. The rubrics for FAI instrument is using the 5 point likert scale. The value of 1 represent very poor performance, 2 represent poor performance, 3 represent medium performance, 4 represent good performance and 5 represent very good performance.

**Step Six**

The next process is to referred the criteria and rubrics to five experts’ panels. The suggestions and feedbacks received from the expert panels are collected for improvising of the FAI Instrument.

**Step Seven**

Next, the pilot study will be done to the selected football players under 14 years old ( N = 30). The purpose of pilot study is to obtain the reliability of FAI Instrument. There are few changes has been made based on feedback during the pilot study. Changes was made n order to best suit the feedback from the pilot study.

**Last Step**

After the validity and reliability of FAI Instrument is obtained, it can be used as a standard instrument to assess the football player’s performance.
Analysis and Results
Identify the Validity of FAI Instrument
The validity concept was introducing by Kelley (1927) whereby the question of validity, aimed at investigating “whether a test really measures what it purports to measure” (Kelley, 1927, p. 14). Ahmad (2004) also concluded that validity is when the instrument really measuring what its intended to measure. According to Russel (1974) a good instrument must take into account the background and behaviour, learning situation and the implementation is good and satisfied, sufficient time to do the assessment and there is a positive change for the subject involved. Sidek and Jamaludin (2005), Rink (2002), Tuckman and Waheed (1981) agreed that the validity of instrument is classified as achieve the high level if r = 0.70.

In this study, the validity of the instrument has been done for two round. For the first round validity the instrument was sent to the expert panels for review and the result as per Table 1. It’s involve five expert panels which is content expert, field expert, football coach with B license, football coach from school level and language expert.

The content of the instrument is submitted to the expert panels for review and evaluation. The questionnaire of content validity is in semantic-scale form with 5 points. Based on the feedback from expert panels, all data is calculated using the formula as follow:

\[
\text{Total Expert Score (x)} \times \frac{100}{\text{Maximum Score}} = \text{Content Validity Achievement}
\]

<table>
<thead>
<tr>
<th>Item/Expert</th>
<th>Expert 1</th>
<th>Expert 2</th>
<th>Expert 3</th>
<th>Expert 4</th>
<th>Expert 5</th>
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</table>

| Σ           | 64       | 49       | 60       | 60       | 61       | 294 | 0.84 |
| M           | 0.91     | 0.70     | 0.86     | 0.86     | 0.87     | 4.20 | 0.84 |
Table 1 show the validity of pilot study is $r = .84$ (n = 5). According to Tuckman and Waheed (1981), Rink (2002) and Sidek & Jamaluddin (2005), the value $r = .70$ is sufficient enough to proof that the instrument achieves a high level validity.

Next, the second round of validity was run as refer to Izwan et al. (2005) to enhance the validity the second process is advisable. The instrument then sent to the expert panels for second review and evaluation. A few items have been reviewed and updated according to the feedback from expert panels.

Table 2. Content Validity by Expert Panels of Pilot Study (Second Time)

<table>
<thead>
<tr>
<th>Item/Expert</th>
<th>Expert 1</th>
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<th>Expert 3</th>
<th>Expert 4</th>
<th>Expert 5</th>
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Based on Table 2, the validity for the second round validation is $r = .91$ (n = 5). All views, comments and reviews from the expert panels were taken into account for improvising.

Identify the Reliability of Examiners (Inter observer reliability) of FAI Instrument

Table 3 show the reliability value for FAI instrument (N = 30) for every items which is psychomotor, cognitive and affective. The result show the reliability value is between $r = .70$ to $r = .74$. 

345
Table 3. Reliability Value for FAI Instrument

<table>
<thead>
<tr>
<th>Variables</th>
<th>Analysis Technique</th>
<th>r</th>
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<tbody>
<tr>
<td>Item in Psychomotor Domain</td>
<td>Pearson product moment</td>
<td>.74*</td>
</tr>
<tr>
<td>Item in Cognitive Domain</td>
<td>Pearson product moment</td>
<td>.70*</td>
</tr>
<tr>
<td>Item in Affective Domain</td>
<td>Pearson product moment</td>
<td>.72*</td>
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</table>

*Significant at .05

The test retest procedures were used to get the value of reliability (Sidek & Jamaludin, 2005). In order to get the reliability, the second assessment will be held to the same subject in different timing. The Pearson product moment correlation is use to get the reliability of the instrument. According to Rink (2002) \( r = .70 \) is sufficient enough for the instrument to be acceptable as a good instrument.

Conclusion

In conclusion, FAI Instrument is suitable to be used as the assessment tool to assess football player under 14 years old. The FAI instrument able to evaluate football players from three learning domain which is psychomotor, cognitive and affective. Moreover, the assessment will help to determine the football players performance status as reference to the coaches. This FAI Instrument can be used as a guidance for coaches to improve the quality of teaching/coaching football players in future.

Reference


